Remarks/Arguments

As of the Office Action mailed July 11, 2005 claims 6, 7 and 9-12 are pending in the application and stand rejected. Reexamination and reconsideration are respectfully requested in light of the amendments and remarks/arguments herein.

Amendments to the Claims

Claim 6 has been amended to recite "removing said oxidized metal surface layer to provide a metal surface that is relatively clean of said oxidized metal surface layer and susceptible to receipt of a metallic coating." Claim 6 has also been amended to recite "applying an iron based metallic coating alloy to said metal surface that is relatively clean of said oxidized metal surface layer." The Examiner requested that such an amendment be made in light of the disclosure, page 6, lines 3-6. Furthermore, a clerical error has been corrected by reciting "applying an iron based metallic alloy". Accordingly, Applicant believes that these amendments render the Examiner's rejection moot and that no new matter has been added by this amendment.

Claims 6 and 11 have also been amended to recite removing [or reducing] said oxidized metal surface layer with said liquid melt of said iron based metallic coating alloy. Support for this amendment is found, for example, in paragraph 0009 which recites "[t]he metallic alloy may form a highly active liquid melt that may be reactive with and remove surface oxidization of metal substrates to be coated." No new matter has been added by this amendment.

In addition, claims 6 and 11 have been amended to recite that the deoxidizing metal is present at levels between 20-70%. Support can be found at paragraph 0013 and 0018 of the published application. At said sections it is written that the deoxidizing element (the disclosed

metals) may fall within the range of 5-70 percent and all increments therebetween. No new matter has been added by this amendment.

Rejections Under 35 USC §102/103

Claims 6-7 and 9-12 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Branagan (U.S. 6,258,185) in view of Kushner et al. (U.S. 4,361,604).

As noted by the Examiner, Branagan teaches that "a metallic barrel **50** [is] sprayed with a molten metal material **52**" and that "[m]olten metal material **52** is sprayed from a spraying device **54** and can comprise, for example, $Fe_{49}Zr_3Mo_7P_{16}C_3Si_2$,DNS2C, DNA3 or DNA6." Col. 6, lines 45-49. Furthermore, Branagan '185 discloses that "[t]he metallic structure formed over and within barrel **50** from material **52** can have greater corrosion resistance than stainless steel." Col. 7, lines 1-3. The drum can be subsequently heat treated. Col. 6, lines 65-67. There is no disclosure however, of reducing or removing an oxidized surface layer with the liquid melt of the iron based metallic coating alloy. The drum, in this embodiment, is not described as having an oxidized surface layer, nor is there discussion of pre-treating the drum prior to coating.

Branagan also teaches that a metallic molten alloy of $Fe_{68}Cr_4Mo_7P_{12}B_6C_3$ is sprayed onto a metallic substrate to form a coating layer. Col. 7, lines 15-18. Branagan discloses that the "[m]aterial **102** also heats an exposed surface of material **100** to form a heat-treated portion **108** of material **100**." However, once again there is no disclosure of reducing or removing an oxidized surface layer with the liquid melt of the iron based metallic coating alloy. The substrate **100**, in this embodiment, is not disclosed to have an oxidized surface layer, nor is there discussion of pre-treating the substrate prior to coating.

Without such an appreciation or disclosure that the substrate surface had formed thereon a native oxide layer the Examiner correctly states that Branagan "explicitly" fails to teach applying an iron based coating alloy melt to remove the oxidized surface layer on the metal substrate.

However, the Examiner then asserts that since "Branagan teaches that the iron based coating melt comprises deoxidizing elements such as Ti and Cr, it would have been obvious to one of ordinary skilled in the art to have applied the iron based coating melt of Branagan in the cleaning step of Branagan in view of Kushner in order to remove any native oxide layer that might have developed over time."

Applicant is somewhat at a loss as to what cleaning step disclosed by Branagan the Examiner may be referencing. While Branagan refers, in the embodiments mentioned by the Examiner, to coating surfaces, it is not taught or suggested that these surfaces are oxidized or that an oxidized surface layer is removed or reduced by or with the liquid melt of the iron based metallic coating alloy. Furthermore, Branagan refers to utilizing the disclosed alloys as powders for surface finishing (i.e. mechanical blasting) and surface treatments such as, for example, shot peening. (Col. 7, lines 63-66). However it is not disclosed by Branagan that these powders for surface finishing or treating are applied prior to the addition of a coating. Furthermore, it is not disclosed by Branagan to apply a liquid melt of iron based metallic coating alloy to a metal surface wherein the metal surface contains an oxidized surface layer and reducing or removing the oxidized surface layer with the liquid melt of the iron based metallic coating alloy. See claims 6 and 11 which recite the use of a liquid melt to remove or reduce the oxidized surface layer.

Furthermore, Applicant has considered Branagan '185 and notes for the convenience of the Examiner that the following alloys are disclosed:

Alloy Compositions	Combined wt% of Cr, Mg, V, Ti, Zr, Hf, Nb, Ta, Al, and Lanthanide Metals	Disclosure
$Fe_{63}Cr_8Mo_2B_{17}C_5Si_1Al_4$	12%	Table 1 DNS2C
$Fe_{64}Ti_3Cr_5Mo_2B_{16}C_5Si_1Al_2Gd_2$	12%	Table 1 DNA3
$Fe_{56}Ni_8Ti_3Cr_5Mo_2B_{16}C_5Si_1Al_2Gd_2$	12%	Table 1 DNA 6
$Fe_{71}Ti_3Cr_7B_{14}C_3Si_2$	10%	Col. 5, lines 66-67
$Fe_{69}Zr_3Mo_7P_{16}C_3Si_2$	3%	Col. 6, lines 47-49
$Fe_{69}Zr_3Mo_7P_{16}C_3Si_2$	3%	Col. 7, lines 13-14
$Fe_{71}Ti_3Cr_7B_{14}C_3Si_2$	10%	Col. 7, lines 13-14
$Fe_{68}Cr_4Mo_7P_{12}B_6C_3$	4%	Col. 7, lines 13-14
$Fe_{68}Cr_4Mo_7P_{12}B_6C_3$	4%	Col. 7, lines 17
$Fe_{74.47}Ti_{2.99},Cr_{5.42},Mo_{4.00},B_{3.60}C_{1.25},Si_{0.59},Al_{1.12},Gd_{6.55}$	16.08%	Col. 8, lines 12-13
$Fe_{78.08},Cr_{9.23}Mo_{4.26}B_{4.08}C_{1.33}Si_{0.62}Al_{2.40}$	11.63%	Col. 8, lines 46-47
$Fe_{64.86}Ni_{9.74}Ti_{2.98}Cr_{5.39}C_{1.25}Si_{0.58}Al_{1.12}Gd_{6.52}$	16.01%	Col. 9, lines 33-34

From the above, the Examiner may now appreciate that in the case of the disclosed alloys, Branagan '185 discloses no more than a combined weight percent of 16.08 % of Cr, Mg, V, Ti, Zr, Hf, Nb, Ta, Al, and Lanthanide metals. The claims herein recite a range of between 20-70% of such metals, which therefore distinguishes over this reference. Furthermore, this is believed to traverse the Examiner's obviousness argument that since Branagan disclosed the use of Ti and Cr, it would have been obvious to utilize Branagan to provide the features of the present claims. As the compositions are different, one cannot necessarily say that the compositions of Branagan '185 inherently have the characteristics of removing or reducing the oxidized surface layer.

Accordingly, there is no teaching or suggestion in Branagan '185 to apply a liquid melt of iron based metallic coating alloy to a metal surface wherein the metal surface contains an oxidized surface layer and reducing or removing the oxidized surface layer with the liquid melt

of the iron based metallic coating alloy. Furthermore, it would not have been obvious to apply the iron based coating melt of Branagan as the alloys disclosed by Branagan include a smaller amount of metals than those of the present application and it cannot be readily implied that such compositions would remove or reduce the oxidized surface layer with the liquid melt.

Kushner fails to make up for the deficiencies of Branagan. Kushner teaches that "it is known to coat metal substrates with a flame spray material to protect the metal." Col. 1, lines 14-22. Furthermore, Kushner teaches cleaning the surface of a substrate reciting that "to provide a substrate with an adherent coating, it is the practice to clean the substrate and prepare the substrate by shot blasting it with steel grit or by threading the surface thereof on a lathe, if the shape is cylindrical, before depositing the metal coating thereon." Col. 1, lines 14-22 (emphasis added).

Kushner, however, does not teach or suggest the steps of applying a liquid melt of an iron based metallic coating alloy to the metal surface wherein the metal surface contains an oxidized surface layer. This is the case as Kushner teaches "it is the practice to clean the substrate ... **before** depositing the metal coating". Accordingly, the step of reducing the oxidized surface layer **with the liquid melt** of the iron based metallic coating alloy would also not be appreciated or recognized by the recited teachings of Kushner.

In addition, the Examiner proposed that by combining Branagan with Kushner, one would be led to cleaning the surface "by shot blasting it with steel grit" and then treating it with the alloy of Branagan. The result of this combination, however, still does not lead to the practice of providing an oxidized metal surface and applying a liquid melt to provide a surface that is relatively clean of the oxidized layer that relies upon the use of an alloy where the deoxidizing metal is present between 20-70% in the iron based metallic coating.

With respect to claim 11, the Examiner asserts that "the claimed reducing of oxidized surface layer and forming of metallurgical bond inherently take place in the process of Branagan in view of Kushner since applying iron based alloy in the cleaning step inherently reduces the oxidized surface layer and applying the iron based coating alloy melt to the cleaned metal surface via plasma spraying inherently forms the metallurgical bond as claimed."

Applicant incorporates by reference the comments noted above, as the basis for the rejection appears to be similar to the rejection noted for claim 6. Specifically, and repeated for the convenience of the Examiner, Applicant does not understand what cleaning step the Examiner refers to. There is no disclosure in either Branagan or Kushner, either alone or in combination, of applying a liquid melt of iron based metallic coating alloy to a metal surface wherein the metal surface contains an oxidized surface layer and **reducing** the oxidized surface layer with the liquid melt of the iron based metallic coating alloy. Furthermore, Branagan does not teach or suggest the claimed alloys at the concentrations of deoxidizing metal noted above

Claims 6-7 and 9-12 have been rejected under 35 U.S.C. §103(a) as being unpatenable over Kammer et al. (U.S. 4,348,433). Like Branagan in view of Kushner, Kammer also fails to teach or suggest all of the steps of the present invention. Kammer fails to apply the liquid melt of said iron based metallic coating alloy to said metal surface wherein said metal surface contains an oxidized surface layer and reducing said oxidized surface layer with said liquid melt of said iron based metallic coating alloy. Similar to Kushner, Kammer states, "it is the practice to clean the substrate and prepare the substrate by shot blasting it with steel grit or by threading the surface thereof on a lathe, if the shape is cylindrical, before depositing the metal coating thereon." Col. 1, lines 22-26. Accordingly, Kammer would have applied his coating to an already cleaned substrate as "it is the practice to clean the substrate...before depositing the metal

coating thereon" (emphasis added) and would not have recognized or appreciated that the liquid melt of the iron based metallic coating alloy would have reduced the oxidized surface layer.

With respect to claim 11, the Examiner states that "the claimed reducing of oxidized surface layer and forming of metallurgical bond inherently take place in the process of Kammer since applying iron based alloy in the cleaning step inherently reduces the oxidized surface layer and applying the iron based coating alloy melt to the cleaned metal surface via flame spraying inherently forms the metallurgical bond as claimed." However, Kammer simply does not apply an iron based alloy in a "cleaning step."

More precisely, Kammer completely fails to teach or suggest applying a liquid melt of the iron based metallic coating alloy to the oxidized metal surface and removing/reducing the oxidized metal surface layer with the liquid melt of the iron based metallic coating alloy to provide a metal surface that is relatively clean of the oxidized metal surface layer. Kammer, like Kushner teaches that cleaning the substrate occurs **before** depositing the metal coating thereon. Col. 1, lines 22-26. Therefore, it would not be suggested to a person of ordinary skill in the art to apply a liquid melt to a substrate including an oxidized surface layer. Furthermore, there is no teaching or suggestion to use the liquid melt to remove or reduce the oxidized layer from the surface.

Expanding on the above, the Examiner indicated that even though Kammer (or Kushner) does not teach applying the iron based coating to remove the oxidized surface, since Kammer (or Kushner) teaches cleaning the substrate BEFORE coating, and since Kammer teaches the use of an iron based coating comprising deoxidizing elements, one of ordinary skill in the art would somehow understand that one should not clean, and apply the coating directly. This is simply not the case and is believed to be completely contrary to the teachings of the cited art. Again,

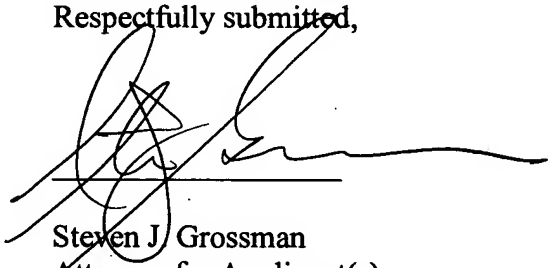
given that there appears to be agreement between Applicant and the Examiner that the indicated references dictate, unequivocally, the need to clean BEFORE coating, it is unclear how one can then logically suggest that the references also stand for the proposition that one should not clean, and apply a coating to an uncleaned surface.

In light of the above, Applicant respectfully submits that claims 6, 7 and 9-12 are not taught or suggested by the cited references. In consideration of the foregoing Applicant respectfully requests that the rejections of claims 6, 7 and 9-12 are withdrawn upon reconsideration.

Having overcome all of the outstanding rejections, it is respectfully submitted that the application is now in condition for allowance. Early and favorable action is respectfully solicited.

In the event that there are any fee deficiencies, or additional fees are payable, please charge, or credit any overpayment to, our Deposit Account No. 50-2121.

Respectfully submitted,



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